

AMENDMENT

Amendments to the Claims

1. (Currently Amended) A method of identifying a head position of a patient undergoing diagnostic imaging, comprising:
obtaining a diagnostic image of a patient's head;
performing an automated image processing operation to determine coordinates of a Talairach anterior commissure (AC) - posterior commissure (PC) reference line within the diagnostic image by identifying a line passing through a hard palate on the diagnostic image and utilizing the identified line to approximate the Talairach AC-PC reference line as about 12 degrees more extended than the hard palate; and
defining a coordinate system of the diagnostic image with reference to the Talairach AC-PC reference line.
2. (Previously Presented) The method of claim 1, further comprising:
prescribing a subsequent scan based on the identified Talairach AC-PC reference line and coordinate system; and
repeating the automated image processing operation to determine current coordinates of the Talairach AC-PC reference for accommodating changes in patient head position since the previous position determination.
3. (Currently Amended) The method of claim 1, wherein obtaining a diagnostic image comprises obtaining a roll and yaw corrected thin section midsagittal magnetic resonance imaging (MRI) image of the patient's head.
4. (original) The method of claim 3, wherein obtaining a midsagittal MRI image of a patient's head further comprises:
obtaining at least two scout views;
identifying midline features to permit correction of roll and yaw; and
obtaining a midsagittal MRI image based on identified midline features.

5. (original) The method of claim 4, wherein obtaining a midsagittal MRI image of a patient's head when identifying midline features to permit correction of roll and yaw further comprises:
performing at least one rapid scan operatively configured to accentuate venous blood flow in the superior sagittal sinus (SSS) in a plane selected from a group consisting of coronal scan, axial scan and oblique scan of the patient's head;
identifying the SSS in cross-section in the at least one rapid scan;
identifying a line that bisects the brain with the line passing through the SSS cross-section; and
defining an attitude correction selected from a group consisting of roll correction and yaw correction corresponding to the selected plane for subsequent scans based on the identified line that bisects the brain.
- 6-11. (cancelled)
12. (Currently Amended) The method of claim 1, wherein obtaining a diagnostic image comprises obtaining a lateral computerized ~~tomography~~ tomography (CT) scout image.
13. (original) The method of claim 12, wherein obtaining a lateral CT scout image of a patient's head further comprises physically adjusting patient's head position relative to a scanner that obtains the lateral CT scout image for minimizing roll and yaw visually.
14. (Cancelled)
15. (Currently Amended) A medical device for performing diagnostic imaging of a patient's head, the medical device comprising:
a scanner operably configured to obtain a thin section diagnostic image of a patient's head positioned therein;
an image processor operably configured to determine coordinates of a Talairach anterior commissure (AC) - posterior commissure (PC) reference line within the thin section

diagnostic image and to define a coordinate system of the diagnostic image with reference to the Talairach AC-PC reference line.

16. (original) The medical device of claim 15, wherein the image processor is further operably configured to prescribe a subsequent scan based on the identified Talairach AC-PC reference line and coordinate system, and to repeat a determination of current coordinates of the Talairach AC-PC reference for accommodating changes in patient head position since the previous position determination.
17. (Currently Amended) The medical device of claim 15, wherein the scanner comprises a selected one of a group consisting of a computerized ~~tomography~~ tomography (CT) machine operably configured to obtain a diagnostic image of a lateral CT scout image, and a magnetic resonance imaging (MRI) machine operably configured to obtain the diagnostic image comprising a midsagittal magnetic resonance imaging (MRI) image of the patient's head.
18. (Currently Amended) A program product, comprising:
 - (a) a program configured to receive a thin section diagnostic image of a patient's brain and to determine coordinates of a Talairach anterior commissure (AC) - posterior commissure (PC) reference line within the thin section diagnostic image and to define a coordinate system of the diagnostic image with reference to the Talairach AC-PC reference line; and
 - (b) a signal bearing media bearing the program.
19. (original) The program product of claim 18, wherein the signal bearing media comprises at least one of a recordable media and a transmission-type media.
20. (Previously Presented) The program product of claim 18, wherein the program is further configured to receive the diagnostic image comprising one from a group consisting of a lateral CT scout image and midsagittal magnetic resonance imaging (MRI) image.

21. (new) The program product of claim 18, wherein determining coordinates of the Talairach AC-PC reference line comprises iteratively searching for and identifying landmarks on the diagnostic image, these landmarks selected from the group consisting of superior sagittal sinus (SSS), corpus callosum, a rostrum of the corpus callosum, an inferior edge splenium of the corpus callosum, mammillary bodies, fornices, and a superior margin of a brainstem.
22. (new) The program product of claim 18, wherein the diagnostic image is a roll and yaw corrected sagittal image section, and wherein wherein determining coordinates of the Talairach AC-PC reference line comprises:
 - a) referencing a template dataset with a known Talairach AC-PC reference line; and
 - b) iteratively minimizing a difference between the sagittal image section and the template dataset.
23. (new) The program product of claim 22, wherein referencing the template dataset further comprises obtaining a previous scan of the same patient with a known Talairach AC-PC reference line.
24. (new) The program product of claim 22, wherein referencing the template dataset further comprises obtaining an institutional standard dataset of an averaged template with a known Talairach AC-PC reference line.
25. (new) The program product of claim 18, wherein the diagnostic image is a lateral computerized tomography (CT) scout image, and wherein the program is further configured to receive a midline sagittal MR scan, and wherein the program is further configured to:
 - a) identify a line passing through the hard palate on the MR scan;
 - b) calculate an angle between the patient's hard palate and the Talairach AC-PC reference line in the MR scan;
 - c) identify a line passing through the patient's hard palate on the diagnostic image;
 - d) utilize the calculated angle to adjust a CT pitch prescription.

26. (new) A method of automatically determining coordinates of a Talairach anterior commissure (AC) - posterior commissure (PC) reference line for a patient's head comprising the steps of:
- a) obtaining a two dimensional coronal scout image of a patient's head, wherein said coronal scout image is obtained as a two dimensional image;
 - b) utilizing automatic parameter estimation to strip scalp and skull from said coronal scout image of the patient's head;
 - c) identifying the sagittal sinus as a bright portion in the upper portion of the coronal scout image;
 - d) determining the roll angle of the patient's brain by bisecting the brain area in the coronal scout image with a line that passes through the sagittal sinus;
 - e) obtaining an axial oblique image, wherein said axial oblique image is obtained as a two dimensional image taken orthogonal to the roll axis;
 - f) utilizing automatic parameter estimation to strip scalp and skull from said axial oblique;
 - g) identifying the sagittal sinus as a bright portion in the posterior portion of the axial oblique image;
 - h) determining the yaw angle of the patient's brain by bisecting the brain area in the axial oblique image with a line that passes through the sagittal sinus;

- i) using the roll angle and the yaw angle, obtaining a single midline sagittal T2-weighted image of the patient's head, wherein said midline sagittal T2-weighted image is obtained as a two dimensional image;
- j) using contour lines, determining the boundary of the corpus callosum in the midline sagittal T2-weighted image of the patient's head;
- k) determining the locations of the rostrum of the corpus callosum, and the inferior edge of the splenium based on the shape of the corpus callosum;
- l) using a concavity map, predicting the location of the mammillary bodies;
- m) statistically estimating candidate positions for the AC and PC based on the shape of the corpus callosum in a triangle formed by the mammillary bodies, the rostrum of the corpus callosum, and the inferior edge of the splenium; and
- n) identifying concavity points nearest the estimated candidate positions for the AC and PC as the AC and PC.